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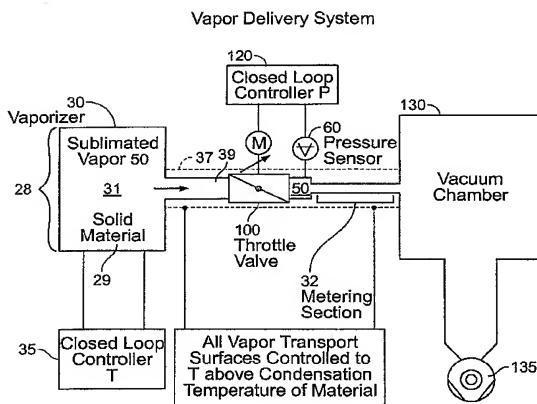
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(54) Title: CONTROLLING THE FLOW OF VAPORS SUBLIMATED FROM SOLIDS



(57) Abstract: A vapor delivery system for delivering a steady flow of sublimated vapor to a vacuum chamber comprises a vaporizer of solid material, a mechanical throttling valve, and a pressure gauge, followed by a vapor conduit to the vacuum chamber. The vapor flow rate is determined by both the temperature of the vaporizer and the setting of the conductance of the mechanical throttle valve located between the vaporizer and the vacuum chamber. The temperature of the vaporizer is determined by closed-loop control to a set-point temperature. The mechanical throttle valve is electrically controlled, e.g. the valve position is under closed-loop control to the output of the pressure gauge. In this way the vapor flow rate can be generally proportional to the pressure gauge output. All surfaces exposed to the vapor from the vaporizer to the vacuum chamber are heated to prevent condensation. A gate valve and a rotary butterfly valve are shown acting as the upstream throttling valve. Employing a fixed charge of solid material, the temperature of the vaporizer may be held steady for a prolonged period, during which the throttle valve is gradually opened from a lower conductance of its operating range as the charge sublimes. When a greater valve displacement is reached, the temperature is raised, to enable the valve to readjust to its lower conductance setting from which it can again gradually open as more of the charge is consumed.

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